

### **ABSTRACT OF THE DISCLOSURE**

The present invention provides a method for depositing nano-porous low dielectric constant films by reacting a mixture comprising an oxidizable silicon component and an oxidizable component having thermally labile groups with an oxidizing gas in gas-phase plasma-enhanced reaction. The deposited silicon oxide based film is annealed to form dispersed microscopic voids that remain in a nano-porous silicon oxide based film having a low-density structure. The nano-porous silicon oxide based films are useful for forming layers between metal lines with or without liner or cap layers. The nano-porous silicon oxide based films may also be used as an intermetal dielectric layer for fabricating dual damascene structures.

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